CLAIMS

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1. A method of transmitting data using a modulation of the multicarrier type, comprising operations of :

- extraction from received data of a first signal representing the transmission quality on each sub-carrier observed and transmitted by a remote device;

- allocation of transmission data to the sub-carriers in an order based on significance of the transmission data and the first signal representing the transmission quality, and

- insertion in transmission data of a second signal representing the order in which the transmission data are allocated to the sub-carriers based on the significance of the transmission data and the first signal;

2. A method of receiving data using a modulation of a multicarrier type, comprising operations of :

- analysis of transmission channel so as to supply a signal representing transmission quality of each sub-carriers in a return direction;

- extraction from received data of a signal representing an order in which the transmission data are arranged by a transmission device on the sub-carriers; and

- formation of the received data according to the signal representing the order in which the transmission data are arranged by the transmission device.

3. A method according to claim 2, wherein the received data are serialized in said formation operation according to the signal representing the order.

4. A device for transmitting data to a remote device, comprising :

- means for allocating the transmission data to the sub-carriers in an order based on significance of the transmission data and transmission quality of the sub-carriers; and

- means for inserting in the transmission data of a signal representing the order in which the transmission data are allocated on the sub-carriers based on the significance of the transmission data and the transmission quality of the sub-carriers.

5. A device according to claim 4, wherein said allocating means allocates the transmission data to the sub-carriers in the order based on the transmission quality of the sub-carriers observed and transmitted by a reception device.

6. Device according to Claim 4, wherein it comprises premodulator means including :

- a means of presenting, to the different inputs of the modulator, each input corresponding to a subcarrier, different data to be transmitted according to a classification of their significance as well as the transmission quality level of each subcarrier in the "outward" direction A → B,

- a means of inserting in the data to be transmitted a signal representing the transmission quality observed in each subcarrier in the "return" direction B → A,

- and a means of inserting, in the data, a signal representing the order in which there are arranged the different data to be transmitted at the input of the premodulator,

and the device also has:

- a post-demodulator means including:

- a means of extracting, from the signal issuing from the demodulator, an FCD signal representing the transmission quality observed by the remote device B on each subcarrier in the "outward" direction

A → B, said signal being generated by the remote device B,

- and a means of analysing the transmission channel so as to supply the signal representing the quality of the transmission of each subcarrier in the "return" direction B → A,

- a means of extracting, from the signal issuing from the demodulator, a signal representing the order in which there were arranged the different data to be transmitted at the input of the premodulator of the remote device B,

- and a means of serialising the data received as a function of the DP signal representing the order in which there were arranged the different data to be transmitted at the input of the premodulator of the remote device B.

7. Device according to either one of Claims 6, wherein the premodulator means also includes a data classification unit and a frequency allocation unit.

8. Device according to Claim 7, wherein the unit for classifying data to be transmitted has means adapted to generate a DS signal representing the significance of each data item supplied by the source.

9. Device according to Claim 7, wherein the frequency allocation unit has means adapted to generate a data allocation command signal (determining the distribution of the data over the different subcarriers), from data including the DS and FCD signals A → B and means adapted to generate a signal representing the order in which there are arranged the different data to be transmitted at the input of the premodulator.

10. Device according to Claim 7, wherein the frequency allocation unit has means adapted to perform operations of:

- initialisation, in which the frequency allocation unit reads the information contained in the FCD, DS and storage signals,

- classification of the subcarriers by order of interference and storage in the table thus obtained,

- classification of the indices of the data to be transmitted in order of significance, using the information contained in the DS signal, and storage of the result of this classification,

- transmission of the signal of the relative positions of the data with respect to each other, to the unit for insertion in the data to be transmitted,

- transmission of the data allocation command signal to the data allocation unit, this DAC signal being in fact composed of pairs (subcarriers, index of the data),

- testing to check whether all the pairs have been supplied, so that, if the test is negative, the following pair is supplied, and if the test is positive, the initialisation step is returned to.

11. Device according to Claim 7, wherein data allocation unit has means adapted to transfer each data item supplied by the source to the subcarrier defined by the frequency allocation unit in the data allocation command signal .

12. Device for the transmission of data from a device A to a remote device B via a transmission channel, according to ~~one of Claims 5 to 11~~ claim 5, wherein it has a CPU calculation unit, a temporary data storage unit, a program storage unit, character entry means, image reproduction means and means allowing inputs and outputs.

13. Telephone, wherein it has a device according to ~~any one of Claims 5 to 11~~ claim 5.

14. Photographic apparatus, wherein it has a device according to any one of Claims 5 to 11.

15. Printer, wherein it has a device according to any one of Claims 5 to 11.

16. Scanner, wherein it has a device according to any one of Claims 5 to 11.

17. Camera, wherein it has a device according to any one of Claims 5 to 11.

18. Computer, wherein it has a device according to any one of Claims 5 to 11.

19. Facsimile machine, wherein it has a device according to any one of Claims 5 to 11.

20. Television receiver, wherein it has a device according to any one of Claims 5 to 11.

21. Audio/video player, wherein it has a device according to any one of Claims 5 to 11.

22. Process for transmitting data over a transmission channel using multi-carrier type modulation, wherein a significance is attributed to each data element or group of data elements for transmission, and the data of different classes thus defined is transmitted using modulators favoring either the bit rate or the bit error rate, according to the class to which the said data belongs.

23. Process for transmitting data over a transmission channel using multi-carrier type modulation, wherein a significance is attributed to each data element or group of data elements for transmission, and the most important data is transmitted after modulation favoring a minimum bit error rate, the other data being transmitted after modulation favoring a maximum data rate.

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24. Process for transmitting data from a local device, A, to a remote device, B, via a transmission channel, local device A comprising a data source, two multi-carrier modulators, the first one being adapted to favor the minimum bit error rate and the second to favor the maximum data rate, multiplexers adapted to select a modulator and a radiofrequency interface;

wherein it comprises operations involving :

- receiving from the source a new succession of data elements for transmission;

- extracting the information of importance that is associated therewith and analyzing this information;

- if the data element is considered to be highly significant, inserting a « Most Significant Data » item of information and applying an algorithm that generates an OFDM symbol after the addition of redundancy bits that reduce the peak value of the signal ;

- if the data is considered to be less significant, inserting a « Least Significant Data » item of information and applying an algorithm that generates an OFDM symbol by using an inverse fast Fourier transform (IFFT) matrix modified so as to reduce the peak value of the signal ;

- transmitting the OFDM symbol generated, via the RF interface.

25. Process according to claim 24, wherein the step of inserting the item of information representative of the type of modulator chosen uses the prefix and the suffix inserted into the data for transmission disposed in the form of OFDM symbols by the module ensuring synchronization of the receiver.

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26. Process for receiving data transmitted by a remote device, A, via a transmission channel, the reception device, B, comprising a radiofrequency receiver, two multi-carrier demodulators, the first one being adapted to favor the minimum bit error rate and the second the maximum data rate, multiplexers adapted to select a demodulator, and a unit for extracting the type of demodulator to use ;

wherein the process comprises operations involving :

- the radiofrequency receiver receiving a new succession of data elements;

- extracting the information of importance that is associated therewith and analyzing this information;

- generating a control signal representative of the type of demodulation to be applied ;

- if the data element is considered to be highly significant, applying a demodulation favoring a minimum bit error rate;

- if the data is considered to be less significant, applying a demodulation favoring a maximum data rate;

- sending demodulated data to the destination.

27. Device, A, for transmitting data to a remote device, B, via a transmission channel, with device A comprising a data source and a radiofrequency interface;

wherein the device according to the invention also comprises two multi-carrier demodulators, the first one being adapted to favor the minimum bit error rate and the second to favor the maximum bit rate, and multiplexers adapted to select a modulator, and an insertion unit responsible for inserting into the data an item of information representative of the modulator chosen

according to a criterion of significance of the data received from the source, the said criterion further commanding the multiplexers.

28. Device according to claim 27, wherein the unit for inserting the item of information representative of the type of modulator chosen uses the prefix and the suffix inserted into the data for transmission disposed in the form of OFDM symbols by the module ensuring synchronization of the receiver.

29. Device for transmitting data according to one of claims 27 to 28, wherein it comprises a computing unit CPU, a unit for temporarily storing data, a program storage unit, character acquisition means, image restoring means and means permitting inputs/outputs.

30. Device, B, for receiving data transmitted by a remote device, A, via a transmission channel, with reception device B comprising a radiofrequency receiver; two multi-carrier demodulators, the first one being adapted to favor the minimum bit error rate and the second the maximum data rate, multiplexers adapted to select a demodulator, and a unit for extracting control data (type of demodulator to be used) and for generating a signal to command the multiplexers.

31. Device for receiving data according to claim 30, wherein it comprises a computing unit CPU, a unit for temporarily storing data, a program storage unit, character acquisition means, image restoring means and means permitting inputs/outputs.

sub 27 32. Telephone, wherein it comprises a device according to any one of claims 27 to 31.

33. Photographic apparatus, wherein it comprises a device according to any one of claims 27 to 31.

34. Printer, wherein it comprises a device according to any one of claims 27 to 31.

35. Scanner, wherein it comprises a device according to any one of claims 27 to 31.

36. Shooting camera, wherein it comprises a device according to any one of claims 27 to 31.

37. Computer, wherein it comprises a device according to any one of claims 27 to 31.

38. Facsimile device, wherein it comprises a device according to any one of claims 27 to 31.

39. Television receiver, wherein it comprises a device according to any one of claims 27 to 31.

40. Audio / video reader, wherein it comprises a device according to any one of claims 27 to 31.

41. Method of managing information transmissions by radio between a base station and at least one peripheral station, communicating information with it by the transmission of carriers modulated by said information, said method including a step of allocating a number of carriers and a modulation to at least one radio communication channel allocated to the transmission of information between said base station and said at least one peripheral station, and a step of determining a number of carriers and a modulation adapted in response to a required service quality, in terms of transmission error rate and transmission rate, for a given transmission of information between said base station and said at least one peripheral station, the adapted number of carriers and modulation differing according to the required service qualities.

42. Method according to Claim 41, wherein the required service qualities are also expressed in terms of transmission error rate threshold and variation in transmission rate acceptable for said given information transmission.

43. Method according to Claim 41 or 42, wherein the step of determining carriers and a modulation is performed during an information transmission between the base station and the at least one peripheral station.

44. Method according to Claim 41 ~~or 43~~, wherein the step of determining carriers and a modulation is performed between two information transmissions between the base stations and at least one peripheral station.

45. Method according to Claim 41, wherein it includes a step of receiving at least one measurement of the transmission error rate on the radio

communication channel allocated to the transmission of information between the base station and the at least one peripheral station.

46. Method according to Claim 45, wherein after the step of receiving said at least one measurement, said method includes a step of analysing said at least one measurement of the transmission error rate and comparing the result of this analysis with the required service quality in terms of transmission rate and transmission error rate.

47. Method according to Claim 46, wherein it includes a step of determining a number of carriers and a modulation which are adapted if the result of this analysis does not meet the required service quality for said transmission.

48. Method according to Claim 41, wherein it includes a step of determining a number of carriers to be allocated which is different from that which was previously allocated to said at least one communication channel between the base station and the at last one peripheral station.

49. Method according to Claim 48, wherein the number of carriers to be allocated to said at least one communication channel between the base station and the at least one peripheral station is greater than that allocated previously to this communication channel.

50. Method according to Claim 48, wherein the number of carriers to be allocated to said at least one communication channel between the base station and the at least one peripheral station is less than the one allocated previously to this communication channel.

51. Method according to Claim 49, wherein it includes, on the one hand, a step of determining a number of carriers to be allocated to a first communication channel between the base station and a first peripheral station which is greater than that which was previously allocated to this first communication channel, and, on the other hand, a step of determining a number of carriers to be allocated to a second communication channel between the base station and a second peripheral station which is less than that which was previously allocated to this second communication channel, in response to

service qualities required respectively for the transmission of information on these communication channels in terms of transmission error rate and transmission rate.

52. Method according to Claim 41, wherein said method also includes a step of determining a modulation to be allocated to said at least one communication channel between the base station and the at least one peripheral station which is different from that previously allocated.

53. Method according to Claims 41, wherein the transmission by modulated carriers uses a technique of modulation by orthogonal frequency division multiplexing OFDM.

54. Method of sending information over a radio communication channel including steps of allocating a number of carriers and a modulation to said information for transmitting these over said radio communication channel, sending said information in the form of carriers modulated by said information, and reconfiguring the number of carriers and the modulation allocated to the information as a function of a required service quality in terms of transmission error rate and transmission rate for a given information transmission, the number of carriers and the modulation reconfigured differing according to the required service qualities.

55. Method according to Claim 54, wherein the required service qualities are also expressed in terms of transmission error rate threshold and variation in the transmission rate which are acceptable for said given information transmission.

56. Method according to Claim 54 or 55, wherein the step of reconfiguring the number of carriers and the modulation is performed during an information transmission.

57. Method according to Claim 54 or 55, wherein the step of reconfiguring the number of carriers and the modulation is performed between two information transmissions.

58. Method according to Claim 54, wherein, prior to the step of reconfiguring the number of carriers and the modulation, said method includes

a step for sending a request to allocate a service quality in terms of transmission rate and transmission error rate for a given information transmission.

59. Method according to Claim 54, wherein the number of carriers reconfigured is different from the number of carriers previously allocated.

60. Method according to Claim 59, wherein the number of carriers reconfigured is greater than the number of carriers previously allocated.

61. Method according to Claim 59, wherein the number of carriers reconfigured is less than the number of carriers previously allocated.

62. Method according to Claim 54, wherein the reconfigured modulation is different from that previously allocated.

63. Method according to Claim 54, wherein the transmission by modulated carriers uses a technique of modulation by orthogonal frequency multiplexing.

64. Method of receiving information coming from a radio communication channel, including a step of receiving said information sent in the form of carriers modulated by said information and a step of selecting the carriers and modulation allocated to said information, and a step of reconfiguring the number of carriers and the modulation to be selected according to a required service quality in terms of transmission error rate and transmission rate for a given information transmission, the number of carriers and the modulation reconfigured differing according to the required service qualities.

65. Method according to Claim 64, wherein the required service qualities are also expressed in terms of transmission error rate threshold and variation in the transmission rate which are acceptable for said given information transmission.

66. Method according to Claim 64 or 65, wherein the step of reconfiguring the number of carriers and the modulation is performed during an information transmission.

67. Method according to Claim 64 or 65, wherein the step of reconfiguring the number of carriers and the modulation is performed between two information transmissions.

68. Method according to Claim 64, wherein said method includes a step of carrying out at least one measurement of the transmission error rate on the radio communication channel allocated to the information transmission in question.

69. Method according to Claim 64, wherein the number of carriers reconfigured is different from the number of carriers previously allocated.

70. Method according to Claim 69, wherein the number of carriers reconfigured is greater than the number of carriers previously allocated.

71. Method according to Claim 69, wherein the number of carriers reconfigured is less than the number of carriers previously allocated.

72. Method according to Claim 64, wherein the reconfigured modulation is different from that previously allocated.

73. Method according to Claim 64, wherein the transmission by modulated carriers uses a technique of modulation by orthogonal frequency multiplexing.

74. Device for managing the information transmissions by radio between a base station and at least one peripheral station communicating information with it by transmitting carriers modulated by said information, said device having means of allocating a number of carriers and a modulation to at least one radio communication channel allocated to the transmission of information between said base station and said at least one peripheral station, and means of determining a number of carriers and a modulation adapted in response to required service qualities, in terms of transmission error rate and transmission rate, for a given information transmission between said base station and said at least one peripheral station, the number of carriers and the modulation adapted differing according to the required service qualities.

75. Device according to Claim 74, wherein the required service qualities are also expressed in terms of transmission error rate threshold and

variation in the transmission rate which are acceptable for said given information transmission.

76. Device according to Claim 74 or 75, wherein it has means of receiving at least one measurement of the transmission error rate.

77. Device according to Claim 76, wherein it has means of analysing said at least one measurement of the transmission error rate and comparing the result of this analysis with the required service quality in terms of transmission rate and transmission error rate.

78. Device according to Claim 74, wherein said device has means of determining a number of carriers to be allocated which is different from that previously allocated to said at least one communication channel between the base station and the at least one peripheral station.

79. Device according to Claim 78, wherein the number of carriers to be allocated to said at least one communication channel between the base station and the at least one peripheral station is greater than that allocated previously to this communication channel.

80. Device according to Claim 78, wherein the number of carriers allocated to said at least one communication channel between the base station and the at least one peripheral station is less than that allocated previously to this communication channel.

81. Device according to Claim 80, wherein it has, on the one hand, means of determining a number of carriers to be allocated to a first communication channel between the base station and a first peripheral station which is greater than that previously allocated to this first communication channel, and, on the other hand, means of determining a number of carriers to be allocated to a second communication channel between the base station and a second peripheral station which is less than that previously allocated to the second communication channel, in response to service qualities required respectively for the transmission of information over this communication channel in terms of transmission error rate and transmission rate.

82. Device according to Claim 74, wherein it also has means of determining a modulation to be allocated to said at least one communication channel between the base station and the at least one peripheral station which is different from that allocated previously.

83. Device according to Claim 74, wherein the transmission by modulated carriers uses a technique of modulation by orthogonal frequency multiplexing.

84. Device for sending information over a radio communication channel, having means of allocating a number of carriers and a modulation to said information for transmitting it over said radio communication channel, means of sending said information in the form of carriers modulated by said information, and means of reconfiguring the number of carriers and the modulation allocated to the information according to a required service quality, in terms of transmission error rate and transmission rate for a given information transmission, the number of carriers and the modulation reconfigured differing according to the required service qualities.

85. Device according to Claim 84, wherein the required service qualities are also expressed in terms of transmission error rate threshold and variation in the transmission rate which are acceptable for said given information transmission.

86. Device according to Claim 84 or 85, wherein the number of carriers reconfigured is different from the number of carriers previously allocated.

87. Device according to Claim 86, wherein the number of carriers reconfigured is greater than that previously allocated.

88. Device according to Claim 86, wherein the number of carriers reconfigured is less than that previously allocated.

89. Device according to Claim 84, wherein the reconfigured modulation is different from that previously allocated.

90. Device according to Claim 84, wherein the transmission by modulated carriers uses a technique of modulation by orthogonal frequency multiplexing.

91. Device for receiving information coming from a radio communication channel, having means of receiving said information sent in the form of carriers modulated by said information, means of selecting the carriers and the modulation allocated to said information, and means of reconfiguring the number of carriers and the modulation to be selected as a function of a required service quality, in terms of transmission error rate and transmission rate, for a given information transmission, the number of carriers and the modulation reconfigured differing according to the required service qualities.

92. Device according to Claim 91, wherein the required service qualities are also expressed in terms of transmission error rate threshold and variation in the transmission rate which are acceptable for said given information transmission.

93. Device according to Claim 91 or 92, wherein it has means of measuring the transmission error rate on the radio communication channel allocated to the information transmission.

94. Device according to Claim 91, wherein the number of carriers reconfigured is different from that which was previously allocated.

95. Device according to Claim 94, wherein the number of carriers reconfigured is greater than that previously allocated.

96. Device according to Claim 94, wherein the number of carriers reconfigured is less than that previously allocated.

97. Device according to Claim 91, wherein the reconfigured modulation is different from that previously allocated.

98. Device according to ~~one of Claims 53 to 97~~ Claim 53, wherein the transmission by modulated carriers uses a technique of modulation by orthogonal frequency multiplexing.

99. Base station able to communicate information by radio with at least one peripheral station wherein said base station includes a device for

managing information transmissions by radio according to ~~one of Claims 74 to 83~~. Claim 74

sub a3 100. Base station according to Claim 99, wherein ~~said base station~~ includes a device for sending information ~~over~~ a radio communication channel according to ~~one of Claims~~ 84 to 90 and a device for receiving this information ~~sent according to one of Claims~~ 91 to 98.

101. Base station according to Claim 99 or 100, wherein it has a computer, a printer, a server, a facsimile machine, a scanner, a digital camera, a digital photographic apparatus, a television, a video recorder or a decoder.

sub a4 102. Peripheral station able to communicate information ~~by radio~~ with a so-called base station, wherein ~~said~~ peripheral station has a device for sending information ~~over~~ a radio communication channel according to one of Claims ~~84 to~~ 90 and a device for receiving this information sent according to one of Claims 91 to 98.

103. Peripheral station according to Claim 102, wherein it has a computer, a printer, a server, a facsimile machine, a scanner, a digital camera, a digital photographic apparatus, a television, a video recorder or a decoder.

sub a5 104. Network, wherein it includes a ~~base station according to one of~~ Claims 99 to 101 and ~~at least~~ one peripheral station according to one of Claims ~~102 to 103~~.